**Urban green spaces in growing oil cities: The case of Sekondi-Takoradi Metropolis, Ghana**

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**Abstract**

Crude oil is often argued to be a natural resource that holds the prospect of accelerated economic development, although the results are mixed. This paper explores how the discovery of crude oil is impacting on urban development, focusing in particular on urban green spaces in Sekondi-Takoradi, a growing oil city in Ghana. Representatives from institutions associated with the management of green spaces, opinion leaders, farmers and residents of the city were interviewed to discover how the provision and use of green spaces has changed over time. High population growth and increasing housing market pressures, in part driven by expectations of an oil-driven boom, are resulting in encroachment, rezoning, and low priority accorded to green spaces, including farmlands, wetlands, forests, parks and

gardens. To address this situation, the article recommends strong public-private collaboration on green space initiatives, prioritisation of green space development agendas, intensive educational campaigns on such spaces, and a strong institutional base to enhance the enforcement of development controls and implementation of green space projects.

*Keywords*: oil, city, urban development, green spaces, Sekondi-Takoradi, Ghana

**Introduction**

Africa as a continent is endowed with many natural resources, including large crude oil deposits in numerous countries, including Nigeria, Algeria, Angola, Libya, and Egypt (African Development Bank, 2009). With recent discoveries of oil in Mozambique, Kenya, Tanzania, Uganda, South Sudan and Ghana, the continent now boasts a long list of oil-producing countries, which have influenced development in the region, be it social, economic or environmental. Although exploitation of oil in commercial quantities in Ghana is quite recent, with the first commercial export leaving the shores of the country in December 2010, it has sparked off considerable development in Sekodi-Takoradi, the closest city to the offshore Jubilee oil field 130 km to the southwest (Eduful & Hooper, 2015). Often regarded as Ghana’s only and West Africa’s newest oil city (Obeng-Odoom, 2012a; Quayson, 2012), Sekondi-Takoradi is now experiencing rapid population growth, with many migrants moving into the city in search of jobs. The city’s population increase from almost 400,000 in 2000 to nearly 560,000 in 2010 has been attributed partly to the oil industry (Eduful & Hooper, 2015; GSS 2012). This high population growth has led to a corresponding boom in the real estate sector, with much construction taking place to accommodate the growing population (Eduful & Hooper, 2015; Obeng-Odoom, 2012b). New accommodation not only takes the form of residential apartments but also many hotels in the hospitality sector to meet the needs of high-income oil-industry expatriates who move to the city for varying lengths of time (Obeng-Odoom, 2014). By 2010, over 40 foreign oil and gas companies with their expatriate workers were operating in the area (Asafu-Adjaye, 2010; Akli, 2010). In association with this development, the city has received a facelift in terms of improved road infrastructure and other social amenities including health centres and schools (Quayson, 2012).

Although all of these developments are enhancing the city’s growth, the extent to which they are impacting on the city’s natural resources, such as green spaces, has been overlooked. Green spaces in this context refer to all open spaces in the city primarily covered by vegetation that are available for human usage, including forest, farmlands, parks and gardens (e.g. Mensah, 2015; Simon, 2016), regardless of the basis of ownership, control and access. Public open space (or green space) as an urban land-use planning zone is thus a subset of all green space. The 2010–2013 Spatial Development Plan of Sekondi-Takoradi Metropolitan Area (STMA) indicated that green spaces are being rapidly cleared to make way for various infrastructural developments, with the emerging oil industry being a contributing factor (STMA, 2011). Further studies by Aduah and Baffoe (2013), and the Cartography and Remote Sensing Unit (2017) of the University of Cape Coast (UCC), conducted using remote sensing and GIS technologies, confirm that over 3,000 hectares of green spaces have been lost to other land uses in the city during the last decade.

This situation makes it critical to protect existing green spaces from encroachment as the city expands rapidly. Most studies that have been undertaken in relation to oil production in the city, however, have concentrated on issues such as land and housing investments, economic development, urbanisation, mobility and changing livelihoods of the residents (Yankson et al., 2017; Planitz & Kuzu, 2015; Adusah-Karikari, 2014; Obeng-Odoom, 2014; Darkwah, 2013). The connection between green spaces and oil-led development in Sekondi-Takoradi remains poorly understood. This paper aims to fill this knowledge gap by exploring the connections between oil exploration and green spaces in the city. The paper thus expands the existing literature on oil cities, which has tended to overlook the integration of green spaces in urban development agendas, and provides policy makers with strategies to help conserve and promote green spaces.

**Oil exploitation and urban development**

Connections between oil exploitation and urban development have been established in various contexts. Whilst in some cases these links are positive, emphasising the benefits to urban centres, especially where the oil extraction is undertaken, in other instances the negative effects of this industry on urban development are highlighted. One broad framework within which these discussions often take place is the oil – urban economic development nexus (Obeng-Odoom, 2014). In terms of this approach, the oil industry and its associated revenues are believed to have the potential to boost economic growth in urban areas by increasing per capita GDP and local revenues, creating more jobs and improving infrastructural developments. This kind of development is often termed “oil-led development”. Empirical examples of this type of development have been highlighted in a range of contexts. Cavalcanti et al.’s (2013) study of oil-producing municipalities in Brazil found rising per capita GDP due to increased economic activities generated through oil production. Reports of increasing employment opportunities and a general upsurge of economic growth have also been found in oil-producing areas as diverse as Dubai (Fazal, 2008) and Texas (The Perryman group, 2014). Other economists and social scientists, however, claim that the abundance of a natural resource, such as oil, leads to lower economic growth, which does not enhance overall development of urban areas (Ackah-Baidoo, 2014; Hammond, 2011). Their arguments fall under the ‘resource curse’, ‘Dutch disease’ and ‘Enclave development’ theses.

According to the resource curse thesis, abundance of natural resources, such as oil, stifles economic development because revenues from such resources make institutions corrupt, limit initiatives for diversification, and create unresponsive governance, which neglects the needs of the masses (Yates, 2012; Hammond, 2011; Sachs & Warner, 1997). While Mexico, Saudi Arabia, the Gulf States and Norway are among the earliest countries where the resource curse phenomenon with respect to oil arguably applied, they have over time utilised oil revenues to underpin broader economic and social development. Norway, indeed, is a model of a mature social democratic welfare state. More recently, many African countries, such as Nigeria, Guinea, Chad and Angola, have also been linked with the resource curse problem (Obeng-Odoom, 2014; Colgan, 2011). The Dutch disease, by contrast, emphasizes the decline or shrinkage of non-resource sectors, such as the manufacturing, agriculture and services sectors, due to increased attention being given to the resource sector (Corden, 1984; Corden & Neary, 1982). This belief is based on the assumption that the resource sector will lead to an appreciation of national income due to new oil discoveries, which in turn makes imports cheaper and exports uncompetitive, leading to the closure of local businesses (Obeng-Odoom, 2014). The enclave development theory, which is often used in a sub-Saharan African context, for example, in relation to Zambia and Sudan, stresses how the benefits of oil production are confined to the oil industry alone, without generating broader urban and regional development (García-Rodríguez, 2013; Ackah-Baidoo, 2012).

Although it is generally accepted that greater urban growth follows oil discoveries (Alissa, 2013; Obeng-Odoom, 2009), what remains contentious is the form of urbanisation that is created. Studies in Venezuela, USA and Libya show that the population of cities increases following the discovery of oil since more people move into these cities for perceived job opportunities (Obeng-Odoom, 2009). These migrants come from rural areas, near or distant cities, as well as from other countries (Okonta & Douglas, 2003). Whilst some people move to such cities by choice, studies have shown that oil spillage or chemicals used for oil exploration can make farmlands infertile and pollute water bodies, forcing people to seek alternative livelihoods within the oil city or even elsewhere (UN-Habitat 2008; Jike, 2004). Deforestation, air pollution, and the loss of human lives have also been established as other notable environmental problems that can make life unbearable for individuals living in or around oil cities and in turn move out (Mmom & Igwe, 2012). This can result in the discovery of oil resulting in urbanisation occurring outside of oil cities. In some instances, urban growth may occur simultaneously both within and outside of oil cities; in Saudi Arabia, for example, while oil production in Eastern Province led to in-situ urbanisation, it also boosted urban growth outside of the province (Al-Mubarak, 1999).

A recent body of sociological work, collectively known as the ‘social disruption thesis’, also seeks to explain the effects of oil production on urban development (Ennis et al., 2013; Lawrie, 2011). The social disruption thesis links oil discoveries to the breakdown of social systems, leading to social problems such as pressure on land for infrastructural development, rising housing prices, high rent, crimes and prostitution (Ennis et al., 2013). Reasons put forward for such social problems include the inability of existing residents of oil cities to intermingle well with new residents, and inadequate facilities to accommodate high population growth (Obeng-Odoom, 2014).

The above discussion shows that oil production can have different effects on the economy, society and environment, both within and outside of oil cities, with the impact on the natural environment generally being negative. This suggests that careful attention needs to be given to the planning and management of environmental resources, such as land and green spaces, which requires an awareness of their potential contribution to urban development, a topic to which we now turn.

**Contribution of green spaces to urban development**

As defined above, the term ‘urban green spaces’ covers all the vegetated areas of an urban area. The designation of Royal Parks in central London and other European capital cities by their respective royal families, attests to a longstanding recognition of the importance of green open space for public health and recreation. Similarly, such recognition was embedded in modern town planning from its beginnings in the late nineteenth century. To wit, Frederick Law Olmsted, a renowned landscape architect, called green spaces “the lungs of cities”, an expression which shows how trees, forest, parks and other green spaces are invaluable to the development of cities (Jennings et al., 2012). Charles Fourier’s fantasy villages (‘phalansteries’), Ernest Callebach’s novel “Ecotopia”, Le Corbusier’s “La ville verte” (the green city), and Ebenezer Howard’s “garden city” model all serve as important theoretical landmarks that supported the incorporation of green spaces into the physical landscape of urban areas (Simon, 2016; Stahle, 2010; Baycan-Levent & Nijkamp, 2009). Accordingly, green spaces, especially parks and similar recreational areas, formed a distinct land use within formal town plans drawn up for colonial cities and new towns. They remain a feature of post-independence town plans, though their fate has been variable in practice. Especially where protective regulations are still enforced, most green spaces remain healthy but, as we demonstrate with respect to Sekondi-Takoradi in this paper, they often suffer encroachment, degradation or even obliteration through a range of formal and/or informal pressures.

In an urban area, apart from buildings and hard land surfaces covered by concrete or tarmac, such as roads, pavements, car parks, and town squares, which are collectively known as grey spaces, green spaces cover an important part of the external environment and include natural or soft surfaces such as soils, grasses, trees and shrubs (Mensah, 2015). These green spaces take different forms, which can be linear (green vegetation along routes), semi-natural (forest, woodland, wetland), functional (farmlands, allotments) and amenity (parks and gardens) in nature (Swanwick et al. 2003; Dunnett et al. 2002). Together with civic grey spaces, i.e. hard surface areas planned basically for public enjoyment, including town squares, plazas and esplanades, green spaces constitute the open spaces in urban areas (Figure 1).

INSERT FIGURE 1 AROUND HERE

Another important way to classify urban green spaces is in terms of accessibility, the simplest version being a distinction between private and public spaces (Figure 1). In practice, there is a range of forms, with several intermediate categories. The most severe pressures and encroachments tend to exist in relation to public open space, be they public parks or undeveloped land comprising road reserves, wetlands and their fringes, or undeveloped open space being ‘banked’ by the local authorities for future development. Sacred groves or ancestral graves constitute a notable exception where traditional religious or ethno-cultural roots still run deep because encroachment or other desecration is taboo (e.g. Mundoli et al., 2017). This applies in Ghana too and can be used to stimulate conservation awareness. Privately owned green spaces, such as back gardens, private school playing fields or sports clubs, are generally well protected and conserved.

There is a growing body of literature showing diverse connections between green spaces and urban development. The connections constitute the social, economic and environmental benefits that green spaces provide to support the development of urban areas (Mensah, 2015). Socially, green spaces such as parks and gardens serve as major resources for leisure and many outdoor recreational activities in urban areas including relaxing, playing with children, walking pets, exploring and observing wildlife (Mensah, 2014; Haq, 2011; Xi-Zhang, 2009). Moreover, the significant roles that urban green spaces play to enhance the development of children cannot be over-emphasized. Frequent contact with urban green spaces has been found to offer children the opportunity to experience close contact with nature, which helps to enhance their knowledge, develop a sense of stewardship for the environment, and in the long run, appreciate and love nature (Lowman, 2006). Children playing in parks and other green spaces have been observed to develop their muscle strength, co-ordination, language, cognitive thinking and reasoning abilities (Isenberg & Quisenberry, 2002).

Improving health conditions of urban dwellers presents another direct and indirect contribution of green spaces to urban development. The use of urban green spaces for physical activities, such as walking, jogging, playing football and other sporting activities, helps control issues of obesity and prevent diseases such as cardiovascular disease, musculoskeletal diseases, stroke and cancer (CJC Consulting, 2005). Other health benefits include improving mental health and psychological well-being (Ernstson, 2012), and alleviating stress (Woo et al., 2009). Further social benefits provided by green spaces include resources such as botanical gardens and zoos, which provide entertainment and support social cohesion by providing avenues (parks and gardens) for different groups of people to come together and play, as well as being used for scientific research and other educational purposes, (Fan et al., 2011; Cohen et al., 2008; Fam et al., 2008).

From an environmental perspective, studies show that the provision of green spaces, such as urban trees, forest, parks and gardens, contributes to regulating the local urban climate (Simon, 2016; Konijnendijk et al., 2013; Fam et al., 2008). The availability of urban trees helps to remove pollutants such as carbon monoxide, nitrogen oxide and sulphur dioxide from the atmosphere to improve urban air quality (Nowak et al., 2006), while also providing shade to counteract the heat island effect (Simon, 2016). From an architectural point of view, green spaces in their different forms enrich urban design and beautify the physical landscape, which in turn improves cities’ attractiveness as places to live, work, and invest in (Manlun, 2003). Conservation of biodiversity (plants and animals) via green spaces helps to protect many organisms, which provide ecosystem services upon which humans depend for their survival. These ecosystem services include the production of food and medicine, support for nutrient cycles and crop pollination, and regulation of floods and erosion.

In the economic realm, urban greening projects provide both temporary jobs (soil preparation, planting) as well as more permanent jobs (maintenance, management) for some urban dwellers (Simon, 2016; Mensah, 2015). The turf grass industry in Australia, for example, provides turf grass to be added to many urban parks, employing around 80,000 people in different capacities (Aldous, 2005), whilst the Johannesburg City Parks and Zoo engage the services of some 1,700 employees to work in a range of capacities on green spaces in the city (Johannesburg City Parks and Zoo, 2014). In addition, the creation of green spaces, such as community forests, botanical gardens, zoos and greening of community centres, attracts tourists whose spending generates income for local businesses (Saraev, 2012). Furthermore, green spaces can generate revenue for governments; as The Trust for Public Lands (2008) study showed, over $18 million tax revenue was generated by the local government authorities of Philadelphia (USA) through the increase in property values of houses close to green spaces.

The overall social, economic and environmental benefits of green spaces in improving living conditions within urban areas make them important resources, which need to be taken into consideration in urban land development activities. In Ghana, the National Urban Policy, which came into force in 2013, provides the policy framework to protect green spaces in the country’s urban areas. The fourth policy objective, which focuses on improving the environmental quality of urban areas, states explicitly that such spaces should be protected from physical development. The policy provides a good framework for the Department of Parks and Gardens (DPG) to operate within as it emphasizes the conservation of green spaces, which should enable the DPGs to perform their roles including landscape beautification and preservation of the built and natural environment. With the passage of Ghana’s Land Use and Spatial Planning Act (Act 925) in 2016, the roles of the DPG have been further strengthened as the Act entrusts the DPGs, together with the Town and Country Planning Departments, to form new bodies called Physical Planning Departments. These new departments have greater autonomy to control physical development on green spaces at the district level. In addition, Act 925 specifies that district assemblies should collaborate closely with the Physical Planning Departments in preparing their local policy documents, such as the Medium-Term Development Plans and Structural Plans, in particular in relation to the conservation of green spaces.

**The study area and methodology**

Sekondi-Takoradi is the industrial and commercial hub of the Western Region of Ghana. It is strategically located about 230 km west of Accra and 130 km east of the Ghana/Côte d'lvoire border (Figure 2), with good access by sea, land and air (Stemn & Agyapong, 2014). Originally Sekondi and Takoradi were two separate fishing settlements lying just a few kilometres apart. In 1946, the two towns were merged into the twin city of Sekondi-Takoradi falling under the jurisdiction of one metropolitan authority, STMA, which is responsible for the overall planning and management of the city. The establishment of the Takoradi harbour and construction of railways promoted trade and attracted migrants from near and far, contributing to the city’s cultural and ethnic diversity and resulting in the population reaching just over 105,000 in 1970 (Obeng-Odoom 2014). Although the economy of STMA has waxed and waned over the years, linked to the collapse of businesses during periods of economic crisis, in recent years manufacturing industries have bounced back, the port handles the key exports of cocoa, timber, bauxite and manganese (World Bank 2015), and the twin city has become the hub for oil companies and associated companies servicing the oil and gas industry (Obeng-Odoom, 2014). The corresponding influx of migrants and physical expansion of the so called ‘oil city’ have resulted in a situation where ‘the challenges of urbanisation seem to have overwhelmed the metropolitan planning and management systems with much development taking place outside of its control’ (Yankson et al., 2017: 85).

INSERT FIGURE 2 AROUND HERE

Sekondi-Takoradi is predominantly covered by tropical rain forest and mangrove vegetation types, which provide green vegetation and should favour the development of green spaces (Ghana Statistical Service, 2014). Apart from the central part of the city, which is low lying, the area is gently undulating with some ridges and hills characterising the city’s physical landscape. The average population density was estimated at 8,140 persons/km2 in 2012 (CHF International, 2012). Land use/land cover change in STMA between 1991 and 2016, i.e. before and after the discovery of oil, shows significant changes in the composition of the city’s land area, with the built environment increasing in size and green spaces becoming substantially smaller (Table 1). In 1991, green spaces covered over 14,500 hectares of land, representing 87 percent of the total land area with the built-up environment covering about 12 percent (1,923 ha). In 2002, the area covered by green spaces had reduced slightly to about 82 percent (13,636 ha) of the total land area whilst the built-up environment had increased correspondingly to about 18 percent. Following the discovery of oil in 2007 and its subsequent exploitation since December 2010, the dynamics of the land composition have changed considerably. Green spaces have shrunk in size by over one-third to 8,845 hectares, whilst the built-up environment (residential, commercial, industrial etc.) has increased in size more than four-fold reaching 7,751 hectares in 2016, resulting in the proportion of built-up area and green spaces being fairly similar (Table 1).

INSERT TABLE 1 AROUND HERE

Further evidence of the loss of green spaces to the built environment is clearly shown in Figures 3 and 4. This process is linked to the population growth of Sekondi-Takoradi Metropolis, which increased from almost 360,000 in 2000 to nearly 560,000 by 2010, when commercial exploitation began. By 2017 an estimated 700,000 people were living in Sekondi-Takoradi giving the city a population growth rate of 3.2 percent, notably higher than the national average of 2.5 percent. Figures 3 and 4 show how the discovery of oil in the context of economic liberalisation has contributed to land-use/land cover change in Sekondi-Takoradi (Acheampong et al., 2018; Fiave, 2017; GIS and Remote Sensing Unit of UCC, 2017; Stemn & Agyapong, 2014; Aduah & Baffoe, 2013, STMA, 2011). Using a longer time period but emphasising recent oil-related urban development, Acheampong et al. (2018) use remote sensing and GIS to demonstrate the particular pressure on agricultural land and forests.

INSERT FIGURE 3 AROUND HERE

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The research reported here was undertaken between November 2015 and May 2017, utilising a qualitative methodology, in particular, a case study approach (Tuli, 2010; Yin, 2003). A range of qualitative research techniques were triangulated, including in-depth interviews, personal observations and the retrieval of archival records. The in-depth interviews were conducted with representatives of institutions associated with the management of green spaces, opinion leaders, farmers and a section of residents of Sekondi-Takoradi. The interviewees were purposively selected as people who either engage in urban greening activities or have considerable experience regarding the management of green spaces in the study area. Among the institutions involved in the study were the STMA’s Development Planning Unit and Department of Parks and Gardens, along with the local offices of relevant national and regional government institutions, namely the Forestry Commission, Environmental Protection Agency, Town and Country Planning Department, Ministry of Food and Agriculture, and Regional Co-ordinating Council. Within these institutions, either their Head or a senior official assigned by the Head was interviewed by prior arrangement. The other participants who were involved in the study (farmers, opinion leaders and residents), were purposively identified through the assistance of resource persons, such as local assembly members, in a range of communities including Sekondi, Takoradi, Inchaban, Essikadu, Fijai, Apremdo and Kwesimintsim. In all, 32 in-depth interviews were conducted and subsequently transcribed and analysed. The archival records utilised were recreational planning schemes, whilst site visits were also organised to observe green spaces in the study area to obtain first-hand information on their present condition. In presenting the findings of the study here, drawing on Dunnett et al.’s (2002) categorization, we turn to consider linear and semi-natural green spaces before presenting amenity and functional green spaces in STMA.

**Linear and semi-natural green spaces in STMA**

Linear green spaces are highly visible in the physical landscape of STMA, especially in the form of trees located along linear features such as transport routes. The road stretching from Paa Grant Roundabout to Kwame Nkrumah Roundabout, Sekondi Road, Adiembra Road and Cape Coast Road all have a mixture of indigenous and exotic trees planted along them (Figures 5 and 6). According to the Department of Parks and Gardens at STMA, the trees were planted along roads in the 1970s and 80s to help absorb exhaust fumes from vehicles in an attempt to purify the air within the city. The high number of vehicles that ply these routes reflects the dominant nature of motorised road transport compared to other transport forms used by urban residents for their daily activities (Yankson et al., 2017). Although railway lines and rivers, such as the Rivers Whin and Kansawora, traverse the city, these do not provide linear green spaces in the same way as the road networks.

INSERT FIGURES 5 AND 6 AROUND HERE

The trees planted along the roads are well spaced-out, resulting in the many branches and leaves forming canopies and hence shaded areas, which encourage walking along the streets. Encroachment onto some sections of the roads by traders and hawkers for commercial activities, however, was observed to have consequences for the linear green spaces. Along some roads (Figure 5 indicated by red arrow), trees have been felled by traders in order to create spaces to sell their items. Information from the Development Planning Unit of STMA revealed that there has been a steady increase in commercial activities since the discovery of oil in the city in response to rising demand linked to population increase. The inadequate spaces to house traders have resulted in many traders using roadsides for their activities. This causes depletion of the trees along the roads and disrupts the continuous pedestrian and sometimes even vehicular flow through the linear spaces. Although this development is similar to the situation in other cities, such as Accra and Kumasi, in Sekondi-Takoradi the intensity of change is distinctive. As Fiave (2017) recently demonstrated, the exploitation of oil and its associated businesses have intensified commercial activities in the city like never before, with many hawkers now using road-sides for selling their wares.

Such encroachment also occurs in the semi-natural green spaces in the city, where its effects were observed to be even greater. This category includes all the green spaces formed through natural processes or purposively created through initiatives such as urban forestry or rehabilitation of derelict lands, including woodlands, wetlands, forest and nature reserves (Dunnett et al. 2002). In STMA, the Monkey Hill Nature Reserve and wetlands surrounding Butua Lagoon, Essei Lagoon and the Whin Estuary are notable examples of semi-natural urban green spaces. An official from the Forestry Commission revealed that such green spaces benefit the city in several ways, including conserving biodiversity, acting as carbon sinks, and supporting eco-tourism. This applies in particular to the area covering the Monkey Hill Nature Reserve and Butua Lagoon, which are especially attractive areas. Close observation of these areas, however, together with interactions with key informants, revealed that these green spaces are now experiencing rapid encroachment due to population pressure linked to oil discovery in the area. As remarked by a representative of the Environmental Protection Agency,

We have the “Monkey Hill” nature reserve which can be found at Paa Grant Roundabout. This place is a very strategic green space but now the oil discovery, which has sparked high population growth in this area, has intensified encroachment of the Monkey Hill and its surrounding lands causing the Monkey Hill to reduce in size. It is a bit sad to find the authorities of STMA sitting idle for the Monkey Hill to be encroached upon and also rezone many green spaces for different purposes (Mr. Y, EPA, in-depth interview, 25/11/2015).

The influx of many migrants, both from within and outside Ghana, to settle in the area has put pressure on green spaces, resulting in the conversion of such lands within and beyond the built-up urban fringe for different uses by individuals and private estate developers. For instance, personal observations in Sekondi-Takoradi found building projects at different stages of construction taking place on semi-natural green spaces such as wetlands (Figure 7). This situation is consistent with Aduah and Baffoe’s (2013) finding of high population growth causing the expansion of Sekondi-Takoradi, which is depleting green spaces throughout the city.

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The conversion of some semi-natural green spaces into different land-uses even has institutional support from the authorities of STMA through rezoning. According to an official from the Town and Country Planning Department (TCPD),

In fact, since the discovery of the oil in this area, we have had quite a large number of rezoning initiatives … approved by the statutory planning committee, which is the highest decision making [body] of [the] STMA. This was not so in the past when the oil was not discovered and the population in the city was not high (Mr J., TCPD, in-depth interview, 25/11/2015).

Rezoning as a planning tool helps to change the use of existing land or property to a different land-use in order to meet the needs of a changing population or conform to a certain development pattern to enhance the welfare of people (City of Pitt Meadows, 2010). Questions arise, however, as to how some of these rezonings were approved by STMA because the places concerned are unsuitable for the purposes to which they have been rezoned. For instance, locations around the former Pioneer Tobacco Company building area, wetlands surrounding the Monkey Hill nature reserve, and the Butua Lagoon were confirmed by the TCPD and the EPA to have been rezoned into commercial and residential areas. Some of these rezonings clearly violate the planning standards in Ghana. For example, the 1996 National Building Regulations of Ghana (LI 1630) restricts the erection of houses or building structures on waterways, areas liable to flooding and reserved lands that support the health and safety of the general public. The resultant effect has been continued depletion of semi-natural spaces with impunity, thereby limiting the environmental benefits which could have been obtained from such spaces (Simon, 2016; Konijnendijk et al., 2013; Fam et al., 2008). This finding can be linked to the enclave development theory, since the benefits of the discovery of oil are not reflected in the development of surrounding green spaces.

**Amenity and functional green spaces in STMA**

By contrast, amenity green spaces such as parks, gardens and play areas created purposely for recreation and human enjoyment, and which serve as core green spaces to enhance cities’ liveability, have always been limited in Sekondi-Takoradi as in other Ghanaian cities, including the capital Accra (Arku et al., 2016). The Department of Parks and Gardens indicated that there are no well-maintained public parks or gardens to cater for outdoor playing and residents’ recreational activities. This absence denies the general public of venues in which to undertake recreational and physical activities to enhance their wellbeing. Such recreational and physical activities are essential as they have been found to provide health benefits and enhance social cohesion among urban residents (Ernstson, 2012; Fan et al., 2011; Fam et al., 2008). The lack of public parks to cater for the recreational needs of the residents indicates that the benefits from the oil industry have not included the development of green spaces within the city. The benefits of oil exploitation being confined primarily within the industry fit in with the idea of enclave development taking place (Ackah-Baidoo, 2012). A representative from the Department of Parks and Gardens (DPG) in STMA indicated that the absence of well-maintained public parks in the area often forced the general public to use their premises for recreational activities:

As I speak now the premises of the Department of Parks and Gardens is the only place that people use for outdoor recreational activities such as wedding reception, relaxation and parties in STMA. Even with this place we have to battle with encroachers before we were able to maintain it up to this level. Aside this venue there is no public park created for such purpose and this is very bad. (Mr X, DPG, in-depth interview, 25/11/2015).

The issue of encroachment, which has caused the destruction of linear and semi-natural green spaces, also emerged as a key problem behind the poor development of amenity green spaces in Sekondi-Takoradi. A DPG official argued that one of the root causes of the encroachment onto amenity green spaces was the apparently unco-operative attitude of the general public towards the preservation of such spaces, since many people now want to take advantage of the oil discovery at the expense of green spaces. Some even expressed interest in trading-off green spaces for jobs in the oil industry. For example, one resident remarked:

To many of us in STMA, what is important now is getting jobs to do especially jobs in the oil industry so that we can get money to cater for our families. This is very important because many of the inhabitants here are jobless so if some of the green spaces could be given to the oil industry to create jobs for us I think it is not a problem (Mr. U, opinion leader, in-depth interview, 26/11/2015).

In the absence of an effective regulatory enforcement, and in a situation of high un- and under-employment, the aesthetic, recreational and wider benefits of public urban green spaces are regarded by many as irrelevant or of lower priority than job creation (Mmom & Igwe, 2012; UN Habitat, 2008). Residents are willing to see urban green spaces encroached upon or dismantled in order to provide opportunities in the oil industry or other livelihoods. This has repercussions for green space conservation because the residents who are usually at the forefront of campaigns to protect such resources, are not interested in doing so. Promoting the oil industry, despite the chances of local residents actually obtaining a job within the industry being slim (Darkwah, 2013), now serves as a priority to many residents regardless of the consequences for green spaces.

The lack of priority afforded to creating green spaces by the city authorities is a problem, as Arku et al. (2016) also show for Accra. It was found that the STMA has recreational planning schemes, which have well-designed parks and gardens to enhance the greenery of the city, but these schemes still remain on the drawing board two decades after they were initially designed. One example is the Essei Lagoon recreational scheme (Figure 8). Designed in 1985, it contained a range of amenity green spaces on paper but was never implemented. This supports Saporiti’s (2006) finding of designed parks not being implemented due to the low priority afforded to green agenda projects that conserve the natural environment.

INSERT FIGURE 8 AROUND HERE

According to a Town and Country Planning Department representative, although the recreational planning schemes of STMA would help enhance the greenery of the city if implemented, they have never been a top priority of the city authorities due to the emphasis on the provision of social infrastructure (schools, roads, markets, electricity, pipe-borne water etc.) to address poverty and basic needs, to the neglect of these spaces. As Arku et al. (2016: 1511) argue, this issue ‘has a historical root as the neglect during the colonial era sowed the seed for subsequent post-colonial administrations’. The Town and Country Planning Department representative further stressed that the discovery of oil has worsened the situation in STMA as it has further shifted the attention of the city authorities away from protecting green spaces to purely promoting socio-economic issues. Analysis of policy documents confirmed the low priority afforded to green spaces in STMA. For example, the 2015 composite budget document highlighted 18 policy objectives adopted by the city to improve the living conditions of the residents but green spaces were not mentioned once (STMA, 2015 p.7). Similarly, the current STMA medium-term development plan (2014-2017), which directs the growth of the city, emphasises issues including health, water and sanitation, housing, market activities and food security, with attention to green spaces conspicuously missing (Metro Planning Co-ordinating Unit, 2014). This shows that the priorities of the city authorities do not lie in the green agenda but are instead centred on the brown agenda, with the discovery of oil and its associated infrastructural development receiving much attention. The forgoing shows some evidence of the Dutch disease thesis applying in the area, with the discovery of oil resulting in less attention to other development initiatives, including green spaces. The cumulative effect of this is non-availability of well-maintained public parks, gardens and outdoor play areas, forcing residents to use the few parks and gardens belonging to institutions.

Functional green spaces, including farmland, institutional grounds, allotments and burial grounds, the first two of which are the most common in STMA, are designed to serve a particular purpose or perform a specific function (Dunnett et al., 2002). Other notable institutional green spaces in STMA include the grounds of high/secondary schools. These institutional green spaces are not meant for public usage but the current lack of public parks in the city results in them playing the double role of serving members of the institutions and the general public. The resulting excessive pressure puts these spaces at high risk of depletion over time.

Concerning farmland, the Sekondi-Takoradi Airport area and patches of land within the city are used for small-scale urban agriculture for both subsistence and commercial purposes, as is common within sub-Saharan Africa cities (Mackay, 2018; Kareem & Raheem, 2012; Lee-Smith, 2010). Interviews with selected farmers revealed that they have experienced farmlands being lost to infrastructural development engineered by pressures brought about by oil exploitation:

I am now almost jobless because two of my farmlands at Inchaban and Kojokrom have now been sold by the landowners to estate developers to construct houses. I am now left with only a small farmland at Esikado, which I use for the cultivation of vegetables. Many of my colleague farmers are in similar condition. We have our farmlands sold to build houses to accommodate many people who have moved to Sekondi-Takoradi because of the oil discovery (Mr P., in-depth interview, 26/11/2015).

Conversion of farmlands to residential apartments and offices is widespread in STMA, spearheaded by the rising demand and thus prices; after the discovery of oil in 2007, house prices rose more than 200 per cent within five years (Yalley & Ofori-Darko, 2012). A more recent study estimated that over 49,000 people, mainly workers in the oil and banking industries, are demanding houses in STMA (Independent oil and Gas Information Centre, 2016). This high demand for houses has encouraged landowners, who, due to the customary land tenure system in Ghana, are mostly chiefs and family members (Gough & Yankson, 2000), to sell green spaces in order to benefit from the favourable housing market. This supports the social disruption thesis, which argues that oil discovery leads to the breakdown of social systems (Ennis et al., 2013) resulting in disruptions or problems in a society, which in this case is reflected in the loss of farmlands and the depletion of other green spaces.

**Conclusion**

Regardless of how they are conceptualised, the diverse categories of urban green spaces in Sekondi-Takoradi are being subjected to different destructive pressures triggered indirectly by the oil industry. High population growth rates and associated housing construction, together with the need for livelihoods, are leading to the felling of trees along roads, encroachment of wetlands, conversion of farmlands to residential and commercial land-uses, and the rezoning of green spaces to residential and industrial land-uses. These areas often constitute a large proportion of accessible land within the city that appears available for ‘development’. The lack of priority given to green spaces in urban development agendas and by the general public has resulted in these developments not being contested and to several recreational planning schemes remaining on the drawing board.

This situation in STMA can partly be explained with reference to the social disruption theory (Ennis et al., 2013; Lawrie, 2011), which links oil discovery to specific problems in society, including destruction of the urban physical landscape due to the breakdown of social systems. The enclave development theory (Ackah-Baidoo, 2012), which stresses how the benefits of oil exploitation are concentrated solely within the oil industry, is also relevant for understanding why green spaces in STMA are coming under increased pressure from urban development, of which the oil industry comprises an important component. Similarly, glimpses of the Dutch disease (Corden, 1984) were also observed in STMA, as the discovery of oil has shifted city authorities’ attention to the oil industry and its related activities, resulting in low priority being afforded to other aspects of the urban development agenda, including green spaces. This shows how these various theses regarding the impact of the discovery of oil on development are not mutually exclusive but can be usefully combined.

These findings call for urgent attention as the oil industry in STMA is still being developed and its future impacts on the urban environment as part of overall urban growth are likely to increase. To safeguard and enhance green spaces within the city, a number of strategies should be adopted. First, systematic collaboration needs to be established between government agencies, the private sector (including the oil industry) and traditional authorities (chiefs) on green space initiatives. Such collaboration could promote the mobilization of resources, including funds, and ideas to enhance the provision of green spaces. The hope is that the oil industry, through recognising its corporate social responsibility (CSR), and potentially other benevolent organisations, would actively participate in green space projects and act to minimise encroachment into such spaces.

Second, the national urban policy, which is undergoing revision, should provide some specifications regarding green spaces, such as the sizes of and accessibility to parks and gardens that a given number of people living in an area should have. Accessibility is more comprehensive than physical distance alone, incorporating other attributes such as physical access, affordability, safety and comfort (Waters, 2016). At the local level, the Mid-term Development Plans, which are prepared periodically (every four years) by the District and Metropolitan Assemblies, should set specific targets on green spaces to be achieved within a given period and frequently evaluate activities to achieve these targets. It is important that city authorities recognise the spectrum of green spaces as essential environmental assets and prioritise their security and enhancement, such as in the development agenda of Sekondi-Takoradi. Such priority can take the form of making necessary arrangements to implement existing recreational planning schemes and integrate green spaces into all new development plans and projects. Intensifying the enforcement of locally appropriate development controls is also important to combat encroachment. In addition, various development plans of the city should be subjected to annual or semi-annual reviews along with the stock of green spaces and if the latter are found to be altered or rezoned, necessary steps should be undertaken to reclaim them. The sanctioning of the encroachers of green spaces should serve as a deterrent to others.

Third, intensive educational campaigns through radio stations, television and community fora should be embarked on to sensitize the general public to the benefits and need to conserve green spaces. This would promote environmental stewardship among the general public and encourage them to protect green spaces within their localities. Whilst this paper has focussed on one case study, the findings resonate more widely in relation to oil cities elsewhere. The increasing demand for land on which to construct housing and support industries within rapidly growing oil cities needs to be carefully managed, otherwise green spaces, with their environmental and social benefits, are likely to disappear. With the wealth generated by the oil industry, it should be possible through CSR and careful planning for green areas within oil cities not only to be conserved but also expanded. This would make oil cities more pleasant places to live, reducing the chances of the enclave development, social disruption and Dutch Disease theses being validated in practice (Ennis et al., 2013), and in turn increase the ability of the oil industry to attract qualified personnel.

**References**

Acheampong, M., Yu, Q., Enomah, L.D., Anchang, J. and Eduful, M. (2018) ‘Land use/cover change in Ghana’s oil city: Assessing the impact of neoliberal economic policies and implications for sustainable development goal number one – A remote sensing and GIS approach’, *Land Use Policy* 73, 373-384.

Ackah-Baidoo, A. (2012) ‘Enclave development and ‘off shore corporate social responsibility’: implications for oil-rich Sub-Saharan Africa’, *Resources Policy,* 37, 152–15.

Aduah, M. S. and Baffoe, P. E. (2013) ‘Remote sensing for mapping land-use/cover changes and urban sprawl in Sekondi-Takoradi, Western Region of Ghana’, *The International Journal of Engineering and Science*, 2(10), 66-73.

Alissa, R. (2013) ‘The oil town of Ahmadi since 1946: from colonial town to Nostalgic city’, *Comparative Studies of South Asia, Africa and the Middle East*, 33(1), 41-58

Al-Mubarak, F. (1999) ‘Oil, urban development and planning in Eastern Province of Saudi Arabia: the case of the Arab American oil company in the 1930’s – 1970s’, *Architecture and Planning*, 11,31-51.

Adusah-Karikari, A. (2014) ‘Black gold in Ghana: Changing livelihoods for women in communities affected by oil production’, *The Extractive Industries and Society*, 2(1), 24-32.

African Development Bank (2009) *Oil and gas in Africa*, Oxford, Oxford University Press.

Akli, E. (2010) ‘*Ghana oil sold for $67*’, The Chronicle, January 21 Edition. pp. 1-17.

Aldous, D. E. (2005) ‘Education and training opportunities for turf management in Australia’, *Acta Horticulturae*, 672,71-7.

Arku, G., Yeboah, I.E.A. and Nyantakyi-Frimpong, H. (2016) ‘Public parks as an element of urban planning: a missing piece in Accra’s growth and development’, *Local Environment*, 21(12), 1500-1515

Asafu-Adjaye, J. (2010) ‘Oil production and Ghana’s economy: what can we expect?’ *Ghana Policy Journal*, 4, 35–49.

Baycan-Levent, T. and Nijkamp, P. (2009) ‘Planning and management of urban green spaces in Europe: comparative analysis’, *Journal of Urban Planning and Development*, 135(1), 1-12.

Cartography and Remote Sensing Unit of UCC (2017) *Land use/ land cover change of STMA between 2002 and 2016*, University of Cape Coast (UCC), Cape Coast, Department of Geography and Regional Planning.

CHF International (2012) *Secondi-Takoradi citizens' report card*, Accra, CHF International.

City of Pitt Meadows (2010) *A guide to rezoning*, Pitt Meadows, Development Services Division.

CJC Consulting (2005) ‘*Economic benefits of accessible green spaces for physical and mental health: scoping study’*, Final Report for the Forestry Commission, UK.

Cohen, D. A., Inagami, S. and Finch, B. (2008) ‘The built environment and collective efficacy’, *Health & Place*, 14(2), 198–208.

Colgan, J., (2011) ‘Oil and resource-backed aggression’, *Energy Policy*, 39(3),1669-1676 doi:10.1016/j.enpol.2010.12.042

Corden, W. M. (1984) ‘Booming sector and dutch disease economics: survey and consolidation’ *Oxford economic Papers*, 36(3), 359–380.

Corden, W. M. and Neary, P. (1982) ‘Booming sector and de-industrialisation in a small open economy’, *The Economy Journal*, 92(368), 825–848.

Darkwah, K. A. (2013) ‘Keeping hope alive: An analysis of training opportunities for Ghanaian youth in the emerging oil and gas industry in Ghana’, *International Development Planning Review*, 35(2), 119–134.

Dunnett, N., Swanwick, C. and Wooley, H. (2002) *Improving urban parks, play areas and green spaces,* London, Department for Transport, Local Government and the Regions.

Eduful, A. and Hooper, M. (2015) ‘Urban impacts of resource booms: the emergence of oil- led gentrification in Sekondi-Takoradi, Ghana’, *Urban Forum*, 26,283–302.

Ennis, G., Finlayson, M. and Speering, G. (2013) ‘Expecting a boomtown? Exploring potential housing - related impacts of large scale resource developments in Darwin’, *Human Geographies*, 7(1), 33- 42.

Eregha, P. B. and Irughe, I. R. (2009) ‘Oil induced environmental degradation in the Nigeria’s Niger-delta: the multiplier effects’, *Journal of Sustainable Development in Africa*, 11 (4), 160 – 175.

Ernstson, H., Barthel, S., Andersson, E. and Borgstrom, S. (2010) ‘Scale-crossing brokers and network governance of urban ecosystem services: the case of Stockholm’, *Ecology and Society*, 15(4), 28.

Fam, D., Mosley, E., Lopes, A., Mathieson, L., Morison, J., and Connellan, G. (2008) ‘*Irrigation of urban green spaces: a review of the environmental, social and economic benefits’ (*CRC for Irrigation Futures Technical Report No. 04/08).

Fan, Y., Das, K.V. and Chen, Q. (2011) ’Neighbourhood green, special support, physical activity and stress: Assessing the cumulative impact’, *Health & Place*, 17,1202-1211.

Fazal, F. (2008) ‘*The urban development in Dubai: a descriptive analysis’* (Master’s thesis), Uppsala, Uppsala University.

Fiave, R. E. (2017) ‘Sekondi-Takoradi as an oil city’, *Geography Research Forum*, 37 (Special edition): 61-79.

García-Rodríguez, F. J., García-Rodríguez, J. L., Castilla-Gutiérrez, C. and Major S. A. (2013) ‘Corporate social responsibility of oil companies in developing countries: from altruism to business strategy’, *Corporate Social Responsibility and Environmental Management*, 20 (6), 371–384, http://dx.doi.org/10.1002/csr.

Ghana Statistical Service (2014) *2010 population and housing census: district analytical report of Sekondi-Takoradi Metropolitan Area*, Accra, Ghana Statistical Service.

Gough, K.V. and Yankson, P.W.K. (2000) ‘Land markets in African cities: the case of peri- urban Accra’, Ghana, *Urban Studies*, 37(13), 2485-2500

GSS [Ghana Statistical Services] (2012) *2010 Population and housing census: summary of report of final results*, Accra, Sakoa Press Limited.

Haq, S. M. A. (2011) ‘Urban green spaces and an integrative approach to sustainable environment’, *Journal of Environmental Protection*, 2, 601-608.

Independent oil and Gas Information Centre (2016), *Ghana’s oil city – what investors are failing tosee?*<http://oilandgasirc.org.gh/page.php?id>=0214&pgtid=3&cntid=newinfo &pd=3&td=newinfo&tsid=9&p=News (Accessed 14 May 2014).

Isenberg, J. P. and Quisenberry, N. (2002), *Play: essential for all children*, A position paper for the Association for Childhood Education International, <http://365waystounplugyourkids.com/play_Essential_for_kidsl.htm> (Accessed 10 March 2012).

Jennings, V., Johnson-Gaither, C. and Gragg, R. S. (2012) ‘Promoting environmental justice through urban green space access: a synopsis’, *Environmental Justice*, 5(1), 1–7.

Jike, T. (2004) ‘Environmental degradation, social disequilibrium, and the dilemma of sustainable development in the Niger Delta of Nigeria’, *Journal of Black Studies*, 34, 686- 701.

Johannesburg City Parks and Zoo (2014) *Annual report 2013/14,* Johannesburg, South Africa, Johannesburg City Parks and Zoo.

Kareem, R. and Raheem, K. (2012) ‘A review of urban agriculture as a tool for building food security in Nigeria: challenges and policy options’, *Journal of Sustainable Development in Africa* 14(3),1-12*.*

Konijnendijk, C. C., Annerstedt, M., Nielson, A. B. and Maruthaveeran, S. (2013) *Benefits of urban parks: a systematic review*, Copenhagen and Alnarp, International Federation of Parks and Recreation Administration.

Lawrie, M., Tonts, M. and Plummer, P. (2011) ‘Boomtowns, resource dependence and socio- economic well-being’, *Australian Geographer,* 42(2), 139–164.

Lee-Smith, D. (2010) ‘Cities feeding people: An update on urban agriculture in equatorial Africa’, *Environment and Urbanization* 22(2), 483-499.

Lowman, M. (2006) ‘No child left indoors’, *Frontiers in Ecology and the Environment,* 4(9), 451-451.

Mackay, H. (2018) ‘Mapping and characterising the urban agricultural landscape of two intermediate-sized Ghanaian cities’, *Land Use Policy*, 70, 182-197.

Manlun, Y. (2003) ‘*Sustainable analysis of urban green space system based on GIS’* (Master’s thesis), Enschede-Netherland, International Institute for Geo- information Science and Earth Observation.

Mensah, C. A. (2015) ‘*Sustaining urban green spaces in Africa: a case study of Kumasi Metropolis, Ghana’* (PhD thesis), Birmingham (UK), University of Birmingham.

Mensah, C. A. (2014) ‘Destruction of urban green spaces: a problem beyond urbanization in Kumasi city (Ghana)’, *American Journal of Environmental Protection*, 3(1), 1 – 9.

Metropolitan Planning Coordinating Unit (2014) *Sekondi-Takoradi Metropolitan Assembly: Final draft Medium –Term Development Plan (2014-2017),* Sekondi-Takoradi, Metropolitan Planning Coordinating Unit.

Mmom, P. C. and Igwe, C. F. (2012) ‘Environmental degradation resulting from Oil exploitation, and population displacement in the Niger Delta, Nigeria’, *Journal of Environmental Science and Engineering B*, 1, 125-136.

Mundoli, S., Manjunatha, B. and Nagendra, H. (2017) ‘Commons that provide: the importance of Bengaluru’s wooded groves for urban resilience’, *International Journal of Urban Sustainable Development*, 9(2), 184-206.

Nowak, D. J., Crane, D. E. and Stevens, J. C. (2006) ‘Air pollution removal by urban trees and shrubs in the United States. *Urban Forestry & Urban Greening’*, 4(3-4), 115-23.

Obeng-Odoom, F. (2009) ‘Oil and Urban Development in Ghana’, *African Review of Economics and Finance*, 1(1), 18–39.

Obeng-Odoom, F. (2012a) ‘Political economic origins of Sekondi-Takoradi, West Africa’s new oil city’, *Urbani izziv*, 23 (2),121-130.

Obeng-Odoom, F. (2012b) ‘Problematising the resource curse thesis’, *Development and Society*, 41(1), 1–29.

Obeng-Odoom, F. (2014) *Oiling the urban economy: land, labour, capital, and the state in*

 *Sekondi-Takoradi, Ghana,* London, Routledge.

Okonta, I. and Douglas, O. (2003) *Where vultures feast: shell, human rights and oil in Niger Delta*, London, Verso.

Planitz, E. and Kusu, D. (2015) *Oil production and the transformation of livelihoods of communities in Ghana,* Accra, Institute for Statistical, Social and Economic Research (ISSER).

Quayson, F. A. (2012) ‘*Oil city? The role of Sekondi - Takoradi in Ghana’s emerging oil industry’* (Master Thesis), Trondheim, Norwegian University of Science and Technology.

Sachs, J. D. and Warner, A. M. (1997) *Natural resource abundance and economic growth,* Cambridge, Centre for International Development and Harvard Institute for International Development, Harvard University.

Saporiti, N. (2006) *Managing national parks: how public-private partnerships can aid conservation.* Washington DC, The World Bank.

Saraev, V. (2012) *Economic benefits of green space: a critical assessment of evidence of net economic benefits,* Forestry Commission Research Report, Edinburgh, Forestry Commission.

Sekondi-Takoradi Metropolitan Assembly (2015) *The composite budget of the Sekondi- Takoradi Metropolitan Assembly,* Sekondi-Takoradi, Sekondi-Takoradi Metropolitan Assembly.

Sekondi-Takoradi Metropolitan Assembly (STMA, 2011) *City spatial development plan, 2010 – 2013*, Sekondi-Takoradi, Sekondi-Takoradi Metropolitan Assembly.

Simon, D. (2013) ‘Climate and environmental change and the potential for greening African cities’, *Local Economy* 28(2), 203-217, <http://dx.doi.org/10.1177/0269094212463674>.

Simon, D. (2016) ‘Green cities: from tokenism to incrementalism and transformation’, in D Simon (ed.), *Rethinking sustainable cities: accessible, green and fair*, Bristol, Policy Press, 61–105.

Stahle, A. (2010) ‘More green space in a denser city: critical relations between user experience and urban form’ *Urban Design International,* 15 (1), 47–67.

Stemn, E. and Agyapong, E. (2014) ‘Assessment of urban expansion in the Sekondi-Takoradi Metropolis of Ghana using Remote-Sensing and GIS Approach’, *International Journal of Science and Technology*, 3(8), 452 – 460.

Swanwick, C., Dunnett, N. and Woolley, H. (2003) ‘Nature, role and value of green space in towns and cities: an overview’, *Built Environment*, 29(2), 94-106.

The Perryman Group (2014) *The economic benefits of oil and natural gas production: An analysis of effects on the United States and major energy producing states*, Texas, The Perryman Group.

The Trust for Public Land (2008) *How much value does the city of Philadelphia receive from its park and recreation system?* Philadelphia, The Trust for Public Land and Philadelphia Parks Alliance.

Tuli, F. (2010) ‘The basic distinction between qualitative and quantitative research in Social Science: reflection on ontological, epistemological and methodological perspectives’, *Ethiop. J. Educ. & Sci.*, 6 (1), 97-108.

UN-Habitat (2008) *State of the world’s cities 2008/2009*, London, Earthscan.

Waters, J. (2016) ‘Accessible cities: from urban density to multidimensional accessibility’, in D Simon (ed.), *Rethinking sustainable cities: accessible, green and fair*, Bristol, Policy Press, 11–59.

World Bank (2015) *Rising through cities in Ghana: Ghana urbanization review overview report*, Washington D. C., World Bank.

Woo, J., Tang, N., Suen, E., Leung, J. and Wong, M. (2009) ‘Green space, psychological restoration, and telomere length’, *Lancet,* 373(9660), 299–300.

Xi-Zhang, S. (2009), ‘*Urban green spaces in Guangzhou (China): Attitude, preference, use pattern and assessment’* (PhD thesis), Pokfulam, University of Hong Kong.

Yalley, P P. & Ofori-Darko, J. (2012) ’*The effects of Ghana’s oil discovery on land and house prices on communities nearest to the oil filed in Ghana (Case Study: Kumasi and Sekondi-Takoradi)’*, (Paper delivered at the 4th West Africa Built Environment Research (WABER) Conference, Abuja, 24–26 July).

Yankson, P.W.K., Gough, K.V., Esson, J. and Amankwaa, E.F. (2017) ‘Spatial and social transformations in a secondary city: the role of mobility in Sekondi-Takoradi, Ghana’, *Geografisk Tidsskrift-Danish Journal of Geography*, DOI: 10.1080/00167223.2017.1343672.

Yates, D. (2012) *The scramble for African oil: oppression, corruption, and war for control of Africa’s natural resources*, London, Pluto.

Yin, R. K. (2003) *Case study research: Design and methods* (3rd edition), Thousand Oaks, Sage Publications.